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Indian Standard

POSITIVE LIST OF CONSTITUENTS OF NYLON-6 POLYMER FOR ITS SAFE USE IN CONTACT WITH FOODSTUFFS, PHARMACEUTICALS AND DRINKING WATER

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

August 1988

Indian Standard

POSITIVE LIST OF CONSTITUENTS OF NYLON-6 POLYMER FOR ITS SAFE USE IN CONTACT WITH FOODSTUFFS, PHARMACEUTICALS AND DRINKING WATER

0. FOREWORD

0.1 This Indian Standard was adopted by the Bureau of Indian Standards on 9 January 1988, after the draft finalized by the Plastics Sectional Committee had been approved by the Petroleum, Coal and Related Products Division Council.

0.2 Plastics are now being used on a large scale for packaging of foodstuffs and pharmaceuticals. Where direct contact occurs between the packed commodity and the plastics, the high molecular mass polymer itself does not pose a toxic hazards being inert and essentially insoluble in food. There is, however, a likelihood that some transfer may occur of polymer additives, adventitious impurities, such as monomers, catalyst remnants and residual polymerization solvents, and of low molecular mass polymer fractions from the plastics into the packaged material with consequent toxic hazard to the consumers. The occurrence of acute toxicity due to plastics materials in contact with food is most unlikely, since only trace quantities of potentially toxic materials are likely to migrate. However, the accumulation of these toxic materials with time may lead to hazards which may be serious.

0.3 Nylon-6 is manufactured by polymerization of caprolactam depending upon the control exercised during manufacturing process, various viscosities of the product may be obtained and which are utilized for different applications. Thus, the product range of nylon-6 consists of low viscosity group of polymers for moulding and medium viscosity group for extrusion to high viscosity group for making blow-moulded containers.

0.3.1 Nylon-6 is highly inert and of self-lubricating nature, it possesses good barrier to gases, high strength, low coefficient of friction and good abrasion resistance.

0.3.2 These properties, when combined with properties of other materials like polyethylene, ionomer, biaxially oriented polypropylene, aluminium foil, etc, give improved performance in flexible packaging in the form of films which are widely used for food packaging.

0.4 This standard is intended to be used with the series of Indian Standards on plastics for food content applications which is given in Appendix A.

0.4.1 Standards for other plastics for food contact application like EVA, EMA copolymers which are under preparation are expected to follow the same pattern, namely, a product specification with a corresponding positive list.

0.5 It is emphasized that these standards need to be used in combination to provide a system of control to the manufacturers of plastics as well as the fabricators of thermoplastic packaging materials to derive maximum benefits. Besides, it may also serve as basis for official agencies to frame suitable legislation to ensure effective safeguards for the safety and health of consumers where thermoplastics for food contact applications are concerned.

1. SCOPE

1.1 This standard covers positive list of constituents of nylon-6 polymers, the manufacturing residues and necessary additives which may be regarded as safe for use in contact with foodstuffs, pharmaceuticals and drinking water, when present only in the prescribed limits of concentration.

1.2 It does not purport to established the suitability of the ingredient singly and in a particular form other than toxicological considerations.

2. TERMINOLOGY

2.0 For the purpose of this standard, the following term shall apply.

2.1 Nylon-6 — A basic resin produced by polymerization of caprolactam.

3. REQUIREMENTS

3.1 Basic Resin — In nylon-6, the residual caprolactam content shall not exceed 1 percent by mass.

3.2 Auxiliary Items for Working

3.2.1 *Phosphoric Acid* — Phosphoric acid content during manufacture shall not exceed 0·2 percent by mass.

3.2.2 *Antifoaming Agents* — The concentration of methyl siloxane shall not exceed 0·01 percent by mass.

3.2.3 *Pigments and Colourants* — The pigments and colourants shall be as specified in IS : 9833-1981*.

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*Classification of pigments and colourants for use in plastics in contact with foodstuffs, pharmaceuticals and drinking water.

3.2.4 *Ultra-Violet Absorbers* — The total residues of ultra-violet absorbers in the finished resin shall not exceed 0·5 percent by mass.

3.2.4.1 The following ultra-violet absorbers may be present in nylon-6:

a) 2-carboxy-benzophenone;
b) 2, 2′-dihydroxybenzophenone;
c) 2-hydroxy-4-methoxybenzophenone;
d) 2, 2-dihydroxy-4-methoxybenzophenone;
e) 2-hydroxy-4-*n*-octoxybenzophenone (*Max* 0·2 percent);
f) Benzyl salicylate;
g) Phenyl salicylate;
h) Tert-butyl-phenyl salicylate (*Max* 0·5 percent);
j) 2-2′-hydroxy-5-methyl-phenyl benzotriazole;
k) 2-(2′-hydroxy-3′, 5′-di-tert-butyl phenol)-5-chlorobenzotriazole; and
m) 2-(2′-hydroxy-3′-tert-butyl-5′methyl phenyl-5-chlorobenzotriazole (*Max* triazole content not to exceed 0·2 percent).

APPENDIX A

(*Clause* 0.4)

LIST OF INDIAN STANDARDS ON FOOD CONTACT PLASTICS

IS : 9833-1981 Classification of pigments and colourants for use in plastics in contact with foodstuffs, pharmaceuticals and drinking water (with Amendment No. 1)

IS : 9845-1986 Methods of analysis for the determination of specific and/or over all migration of constituents of plastics materials and articles intended to come into contact with foodstuffs (*first revision*)

IS : 10141-1982 Positive list of constituents of polyethylene in contact with foodstuffs, pharmaceuticals and drinking water (with Amendment No. 1)

IS : 10142-1982 Styrene polymers for its safe use in contact with foodstuffs, pharmaceuticals and drinking water

IS : 10146-1982 Polyethylene for its safe use in contact with foodstuffs, pharmaceuticals and drinking water

IS : 10148-1982 Positive list of constituents of polyvinyl chloride (PVC) and its copolymers in contact with foodstuffs, pharmaceuticals and drinking water

IS : 10149-1982 Positive list of constituents of styrene polymers in contact with foodstuffs, pharmaceuticals and drinking water

IS : 10151-1982 Polyvinyl chloride (PVC) and its copolymers for its safe use in contact with foodstuffs, pharmaceuticals and drinking water (with Amendment No. 1)

IS : 10171-1986 Guide on suitability of plastics for food packaging (*first revision*)

IS : 10909-1984 Positive list of constituents of polypropylene and its copolymers in contact with foodstuffs, pharmaceuticals and drinking water

IS : 10910-1984 Polypropylene and its copolymers for its safe use in contact with foodstuffs, pharmaceuticals and drinking water

IS : 11434-1985 Specification for ionomer resins for its safe use in contact with foodstuffs, pharmaceutical and drinking water

IS : 11435-1985 Positive list of constituents of ionomer resins for its safe use in contact with foodstuffs, pharmaceuticals and drinking water

IS : 11704-1986 Specification for ethylene/acrylic acid (EAA) copolymers for their safe use in contact with foodstuffs, pharmaceuticals and drinking water

IS : 11705-1986 Positive list of constituents of ethylene/acrylic acid (EAA) copolymers for their safe use in contact with foodstuffs, pharmaceuticals and drinking water

IS : 12229 - 1987 Positive list of constituents of polyalkylene terephthalates (PET and PBT) for their safe use in contact with foodstuffs, pharmaceutical and drinking water

IS : 12247 - 1988 Specification for nylon-6 polymer for its safe use in contact with foodstuffs, parmaceuticals and drinking water

IS : 12252 - 1987 Polyalkylene terephthalates (PET and PBT) for their safe use in contact with foodstuffs, pharmaceuticals and drinking water

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(*Page* 1, *clause* 3.2.1, *line* 2) — Substitute '0.15' *for* '0.2'.

(*Page* 1, *clause* 3.2.2, *line* 2) — Substitute '0.04' *for* '0.01'.

(PCD 12)

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